Optically Well-Studied Clusters With Cool Gas Temperatures

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Final Report

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We obtained and analyzed a 3000 second PSPC observation of the southern cluster of galaxies S753. Although the flat-field, exposure corrected image gave only a hint of diffuse X-ray emission from an intracluster medium (see Figure 1), smoothing this region on larger scales showed the presence and extent of a hot ICM (see Figure 2). We used the smoothed image to define sources and regions for spectral analysis.

We excluded point sources and measured the X-ray spectrum of the ICM in four annular regions, to an outer radius of 16'. We compared the spectra to Raymond models and found that the gas is isothermal (within the uncertainties) with a temperature of about 2 keV, with possibly a cooler component in the inner 2'(from a possible cooling flow). We also measured the X-ray surface brightness profile. Under the reasonable assumption that the gas is in hydrostatic equilibrium, we used the gas density profile derived from the surface brightness profile and an ICM temperature of 2.5 keV to derive the total cluster mass as a function of cluster radius. From optical observations, we have obtained velocities for about twelve galaxies in this poor cluster. We will use these to make a second estimate of the total cluster mass for comparison with our X-ray measurements.

A paper on this short analysis is in preparation for submission to the ***PASP***. Proposal funding was used entirely to support the visit of L. DaCosta to CfA.

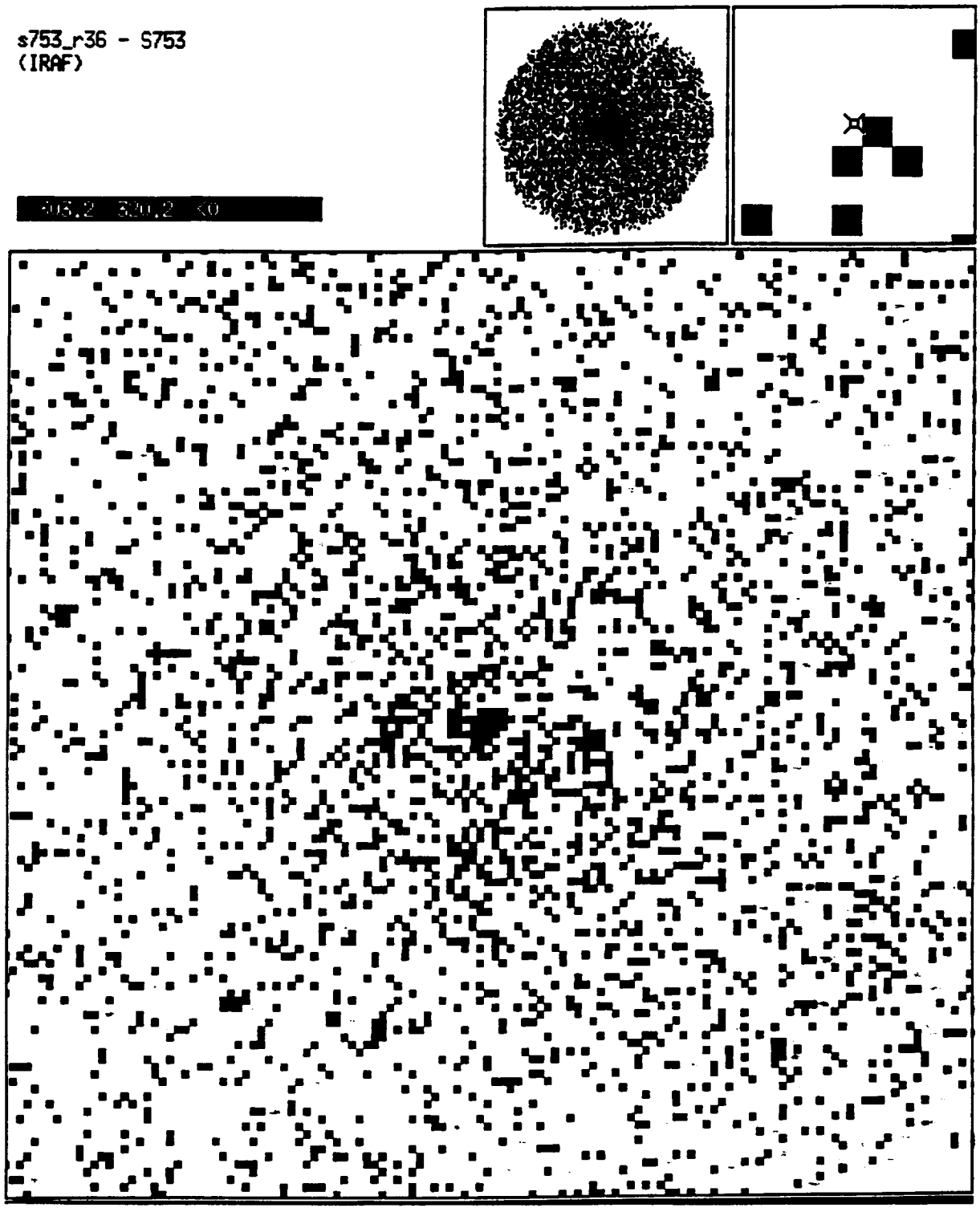

Figure 1. Photon map of our 3000 second PSPC exposure of S753.

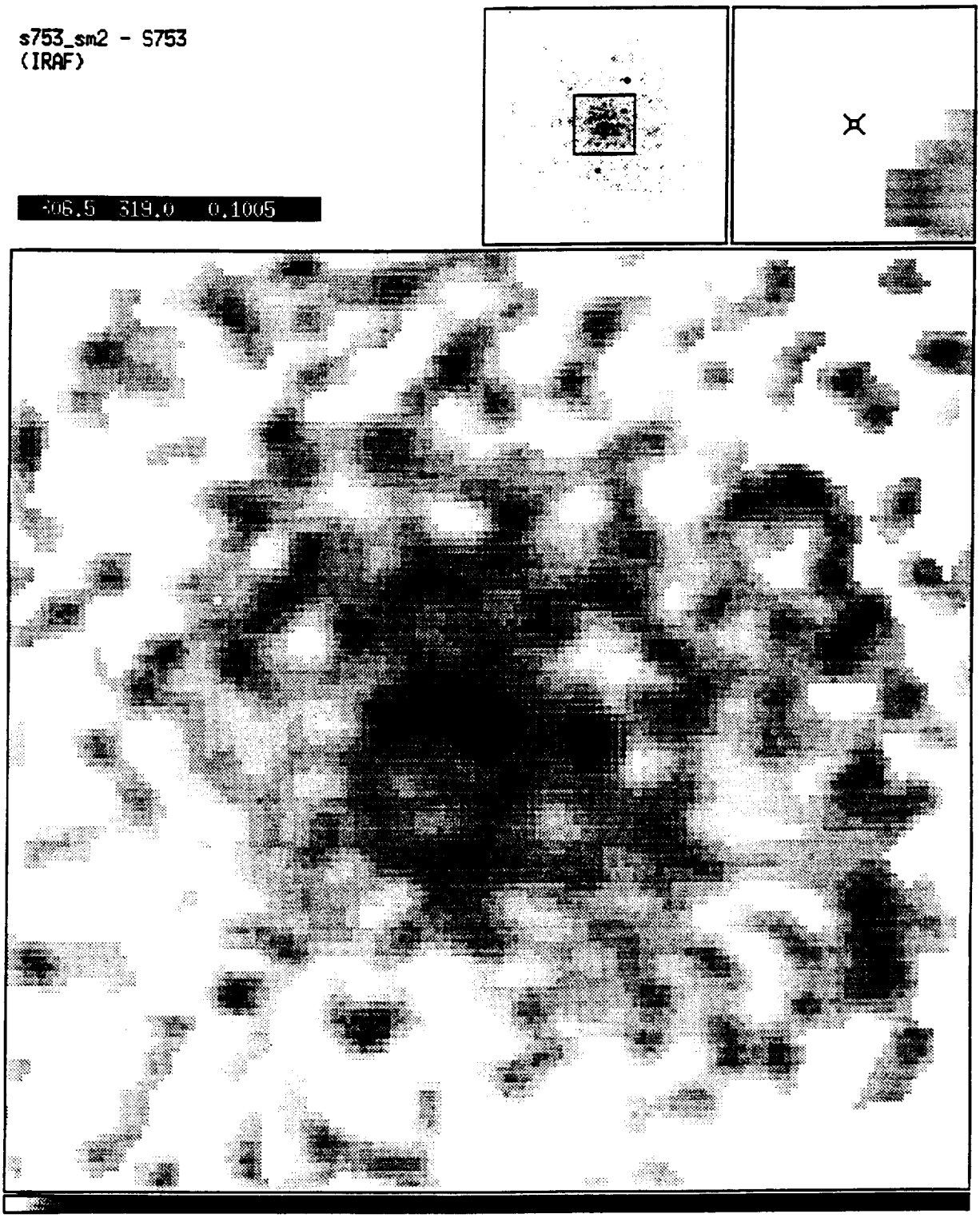

Figure 2. Smoothed intensity profile from Figure 1.